NAME: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 10.1 part 2: ***Looking at 2-way tables***

Copy the class data from the board:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Brown** | **Green** | **Hazel** | **Blue** | **Black** | total |
| **Male** |  |  |  |  |  |  |
| **Female** |  |  |  |  |  |  |
| total |  |  |  |  |  |  |

What is the row variable? What is the column variable?

# of cells = Total sample size (n) =

**Answer the following:**

1. What percent of the class has brown eyes? What percent of the class has blue eyes?
2. What percent OF MALES have blue eyes? What percent of the class is male?
3. What percent of the class is male AND has hazel eyes?
4. What percent of females have brown eyes?
5. To study the relationship between party affiliation and support for a balanced budget amendment, 500 registered voters were surveyed with the following results:

|  |  |  |  |
| --- | --- | --- | --- |
|  | For | Against | No opinion |
| Democrat | 50 | 150 | 50 |
| Republican | 125 | 50 | 25 |
| Independent | 15 | 10 | 25 |

1. Create your totals rows/columns What is the row variable?
2. How many cells are there? What is the column variable?
3. What percentage of those surveyed were Democrats?
4. What percentage of those surveyed were FOR the amendment **and** were Republican?
5. What percentage of those FOR the amendment are also Republicans?
6. What percentage of Independents had no opinion?
7. What percentage of those against the amendment were Democrats?
8. What percentage of those that had no opinion were Independents?
9. What percentage of those surveyed were democrats **and** had no opinion?
10. **We are looking to choose a hospital for an upcoming surgery. We find the following statistics about the survival of patients that had a similar surgery at two local hospitals:**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Hospital A** | **Hospital B** | total |
| **Died** | 63 | 16 |  |
| **Survived** | 2037 | 784 |  |
| total |  |  |  |

1. What is the row variable? What is the column variable?
2. What percentage of patients chose hospital A?
3. What percentage of patients chose hospital B?
4. What percentage of patients died? What percentage of patients survived?
5. What percentage of patients that went to hospital A died?
6. What percentage of patients that went to hospital B died?
7. What percentage of patients went to hospital B ***and*** died?
8. What percentage of patients went to hospital A ***and*** died?

***Inference on 2-way tables: Chi-Square test for Association***

Comparing gender of Stat students to their college location choices

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Female** | **Male** | **total** |
| **In-State** | 17 | 21 |  |
| **Out of State** | 9 | 18 |  |
| **Total** |  |  |  |

**Question: Is there an association between the row and column variables?**

* Compare…
* Use…

**If we are doing a Chi-Square test, we need expected values. Question: How do we find expected values?**

Expected Cell Count = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Find the expected cell counts for the table of college choices versus gender:

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Female** | **Male** | **total** |
| **In-State** |  |  |  |
| **Out of State** |  |  |  |
| **Total** |  |  |  |

**Chi-Square Test for Association**

* Want to test…

**Hypotheses:**

* **Ho:**
* **Ha:**
  + No association =

**Test Statistic:**

* Same!

**P-Value:**

* Work:
* df =

**Conclusion:**

* Same 2 sentences!
  + Reject / Fail to reject….
  + Sufficient evidence… (re-copy Ho or Ha)

**On Calculator:**

**Conditions:**

* SRS
* All expected counts > 5

# Try these:

1. The manager of an assembly process wants to determine whether the number of defective articles manufactured depends on the day of the week the articles are produced. Using the data below, is there sufficient evidence to determine if the number of defective articles is independent of the day of the week?

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Day** | **Mon.** | **Tue.** | **Wed.** | **Thur.** | **Fri.** |
| Nondef. | 85 | 90 | 95 | 95 | 90 |
| Defective | 15 | 10 | 5 | 5 | 10 |

1. The following table is from the July 1993 publication of *Vital and Health Statistics* from the Centers for Disease Control and Prevention/National Center for Health Statistics. The individuals in the following table have only one of the three indicated irritations. Determine if the type of irritation is independent of the age group.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Irritation** | **18-29** | **30-44** | **45-64** | **65+** |
| Eye | 440 | 567 | 349 | 59 |
| Nose | 924 | 1311 | 794 | 102 |
| Throat | 253 | 311 | 157 | 19 |